

REMARKS

This responds to the Office Action mailed on March 29, 2004.

Claims 1-15 and 31-64 were previously canceled without prejudice. By way of this amendment, claims 22-25 and 86 have been canceled without prejudice.

Claims 16-21, 27, 65-66, 70-71, 75-76, 81-82, and 87 have been amended. Claims 100-107 have been added. As a result, claims 16-21, 26-30, 65-85, and 87-107 are now pending in this application.

For the convenience of the Examiner, Applicants' remarks concerning the claims will be presented in the same order in which the Examiner presented them in the Office Action.

Amendments to the Specification

Applicants have amended the paragraph beginning on page 11, line 16, by inserting "substantially planar" before "upper surface". This amendment is made to provide support for corresponding language in claim 16, as amended. Support for this amendment may be found, for example, in FIG. 4 of the application as originally filed.

The paragraph beginning on page 20, line 16, has been amended by substituting "530" for "510". Support for the correction of this typographical error may be found, for example, in the immediately preceding sentence of the paragraph.

Applicants have amended the paragraph beginning on page 23, line 24, by substituting the word "Application" for "Invention".

No new matter has been added by way of these amendments to the specification.

Amendments to Claims 16-21, 27, 65-66, 70-71, 75-76, 81-82, and 87

Claims 16-21, 27, 65-66, 70-71, 75-76, 81-82, and 87 have been amended. No new matter has been introduced.

Certain of the amendments to the claims are made to satisfy Applicants' preferences, not necessarily to satisfy any legal requirement(s) of the patent laws, and they are not intended to limit the scope of equivalents to which any claim element may be entitled.

Independent claim 16 has been amended by inserting the phrase “a substantially planar upper surface and”; by inserting the phrase “on the upper surface”; by substituting the phrase “wherein the at least one capacitor comprises top and bottom surfaces, each having a plurality of terminals of first and second polarity types, wherein a selected terminal of first polarity type on the bottom surface is electrically coupled to a first conductor, and wherein a selected terminal of second polarity type on the bottom surface is electrically coupled to a second conductor” for the phrase “and electrically coupled to at least one of the conductors”; by inserting the phrase “comprising a plurality of IC terminals on a surface thereof, wherein the IC terminals are”; and by substituting the phrase “selected terminals of first and second polarity types on the top surface of the capacitor” for the phrase “the plurality of conductors”. Support for these amendments may be found, for example, in FIGS. 3-4 and in the corresponding written description beginning on page 10, line 29.

Dependent claim 17 has been amended by deleting the phrase “wherein the at least one capacitor is electrically coupled to first and second conductors of the plurality of conductors, and”.

Dependent claim 18 has been amended by substituting the phrase “first and second conductors” for the phrase “at least one conductor”. Support may be found, for example, as indicated for the amendments made to claim 16.

Dependent claim 19 has been amended by changing its dependency to claim 16 and by substituting “at least three” for “two”. Support may be found, for example, in FIGS. 5-6 and in the corresponding written description beginning on page 13, line 26.

Dependent claim 20 has been amended by changing its dependency to claim 16 and by deleting the phrase “having two surfaces, each having a plurality of terminals of first and second polarity types”.

Dependent claim 21 has been amended by changing its dependency to claim 16; by adding the word “capacitor”; and by adding the phrase “top and bottom”. Support may be found, for example, in FIGS. 8-9 and in the corresponding written description beginning on page 16, line 3.

Dependent claim 27 has been amended by substituting the phrase “first and second conductors to which it is electrically coupled” for the phrase “at least one conductor”.

Independent claim 65 has been amended by inserting the phrase “wherein the conductors include at least a first conductive bar having a height and a width, the height exceeding the width”; by substituting the phrase “the first conductive bar” for the phrase “at least one of the conductors”; and by substituting the phrase “first conductive bar” for the phrase “at least one conductor”. Support may be found, for example, in the paragraph beginning on page 11, line 16, and in original claim 59.

Dependent claim 66 has been amended by inserting the word “further”; by substituting the phrase “a second conductive bar” for the phrase “first and second conductors”; by deleting “and” (first occurrence); by substituting “conductive bar” for “conductor” (two occurrences); and by inserting “wherein”. Support may be found, for example, in original claim 59.

Independent claim 70 has been amended by inserting the phrase “wherein the conductors include at least a first conductive bar having a height and a width, the height exceeding the width”; and by substituting the phrase “the first conductive bar” for the phrase “at least one of the conductors”. Support may be found, for example, in the paragraph beginning on page 7, line 3; in FIGS. 13-14; and in page 21, lines 1-4.

Dependent claim 71 has been amended by inserting the word “further”; by substituting the phrase “a second conductive bar” for the phrase “first and second conductors”; by deleting “and” (first occurrence); by substituting “conductive bar” for “conductor” (two occurrences); and by inserting “wherein”. Support may be found, for example, as mentioned regarding claim 70.

Independent claim 75 has been amended by inserting the phrase “and wherein the plurality of conductors include at least a first conductive bar having a height and a width, the height exceeding the width”; and by substituting the phrase “the first conductive bar” for the phrase “at least one of the conductors”. Support may be found, for example, as mentioned regarding claim 70.

Dependent claim 76 has been amended by inserting the word “further”; by substituting the phrase “a second conductive bar” for the phrase “first and second conductors”; by deleting “and” (first occurrence); by substituting “conductive bar” for “conductor” (two occurrences); and by inserting “wherein”. Support may be found, for example, as mentioned regarding claim 70.

Independent claim 81 has been amended by inserting the phrase “wherein the plurality of conductors include at least a first conductive bar having a height and a width, the height

exceeding the width”; and by substituting the phrase “the first conductive bar” for the phrase “at least one of the conductors”. Support may be found, for example, as mentioned regarding claim 70.

Dependent claim 82 has been amended by inserting the word “further”; by substituting the phrase “a second conductive bar” for the phrase “first and second conductors”; by deleting “and” (first occurrence); by substituting “conductive bar” for “conductor” (two occurrences); and by inserting “wherein”. Support may be found, for example, as mentioned regarding claim 70.

Dependent claim 87 has been amended by changing its dependency to claim 82.

Examiner's Indication of Allowable Subject Matter;
Status of Claims 25, 79-80, 83, and 86-87;
New Claims 100-107

Applicants note with appreciation the allowance of claims 88-99.

Claims 25, 79-80, 83, and 86-87 were objected to as being dependent upon a rejected base claim, but they were indicated to be allowable if rewritten in independent form including all of the limitations of their respective base claims and any intervening claims. The status of each of claims 25, 79-80, 83, and 86-87 will now be briefly discussed.

Claim 25 has been canceled and rewritten as new independent claim 100. Thus, independent claim 100, as well as its dependent claims 101-104, should be allowable.

New dependent claim 101 is based upon original claim 23.

New dependent claim 102 is based upon original claim 17.

New dependent claim 103 recites that the capacitor comprises terminals on two sides, wherein the terminals are electrically coupled to the first and second conductive bars, respectively. Support may be found, for example, in FIGS. 10-14 and in the original written description on page 28, lines 21-24.

New dependent claim 104 is based upon original claim 26

Subject matter previously in claim 79 has been rewritten as new independent claim 105. Thus, independent claim 105, as well as its dependent claims 106-107, should be allowable. Claim 79 has not been canceled, and it continues to be dependent upon claim 75.

New dependent claim 106 is based upon original claim 26.

New dependent claim 107 is similar to previously presented claim 80.

Claims 80 and 83 continue to be dependent upon claims 79 and 81, respectively.

Claim 86 has been canceled.

The dependency of claim 87 has been changed from claim 86 to claim 82.

The previously allowed claims (88-99) and the new claims (100-107) based upon claims that were indicated as being allowable if rewritten in independent form should all be allowable.

Rejection of Claims 22 and 27
Under 35 U.S.C. §112, Second Paragraph

Claims 22 and 27 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

The Examiner stated that the antecedent basis for “the at least one conductor” is unclear.

Claim 22 has been canceled.

Claim 27 has been amended to recite “the first and second conductors to which it is electrically coupled”. Applicants believe the antecedent basis is clear, and Applicants respectfully request that the rejection of claim 27 under 35 U.S.C. §112, second paragraph, be withdrawn.

Rejection of Claims 16, 17, 22-24, 28, and 30
Under 35 U.S.C. §102(e)
as Anticipated by Drake

Claims 16, 17, 22-24, 28, and 30 were rejected under 35 U.S.C. §102(e) as being anticipated by Drake (U.S. 6,404,649). Applicants do not admit that Drake is prior art and reserve the right to swear behind Drake as provided for under 37 C.F.R. §1.131.

Drake discloses a PCB assembly in which a capacitor 103 (FIG. 3) may be interposed between a BGA package 110 and a PCB 101 within the perimeter of the contact pads that form a BGA footprint 102 (See Abstract). It will be noted that in Drake the BGA package 110 is not electrically coupled to terminals on the top surface of capacitors 103 (see FIG. 4).

The rule under 35 U.S.C. §102 is well settled that “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a

single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2D 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). MPEP §2131.

Drake fails to disclose all of the structural elements recited in claim 16, as amended. For example, Drake fails to disclose an IC having terminals electrically coupled to selected terminals of first and second polarity types on the top surface of a capacitor.

For the above reasons, claim 16 should be found to be allowable over Drake, and Applicants respectfully request that the rejection of claim 16 under 35 U.S.C. §102(e) as anticipated by Drake be withdrawn.

Claims 17, 22-24, 28, and 30, which depend from claim 16 and incorporate all of the limitations therein, are also asserted to be allowable for the reasons presented above.

Rejection of Claims 16-19, 22, 23, and 26
Under 35 U.S.C. §102(b)
as Anticipated by Menzies

Claims 16-19, 22, 23, and 26 were rejected under 35 U.S.C. §102(b) as being anticipated by Menzies (U.S. 4,882,656).

Menzies discloses a DIP IC package 11 (FIG. 1) inserted over an auxiliary capacitor board 20 on a PCB 12. It will be noted that in Menzies the IC package 11 is not electrically coupled to terminals on the top surface of capacitor board 20.

Menzies thus fails to disclose all of the structural elements recited in claim 16, as amended, because Menzies fails to disclose an IC having terminals electrically coupled to selected terminals of first and second polarity types on the top surface of a capacitor.

For the above reasons, claim 16 should be found to be allowable over Menzies, and Applicants respectfully request that the rejection of claim 16 under 35 U.S.C. §102(b) as anticipated by Menzies be withdrawn.

Claims 17-19, 22, 23, and 26, which depend from claim 16 and incorporate all of the limitations therein, are also asserted to be allowable for the reasons presented above.

Rejection of Claims 16-19, 22-24, 26, and 30**Under 35 U.S.C. §102(b)****as Anticipated by Wallace**

Claims 16-19, 22-24, 26, and 30 were rejected under 35 U.S.C. §102(b) as being anticipated by Wallace (U.S. 5,010,447).

Wallace discloses a memory device 14 (FIG. 1) mounted over a capacitor 16 that extends into a pocket formed in the bottom surface of the memory device (col. 3, lines 26-28). It will be noted that in Wallace the memory device 14 is not electrically coupled to terminals on the top surface of capacitor 16.

Thus, Wallace fails to disclose all of the structural elements recited in claim 16, as amended, because Wallace fails to disclose an IC having terminals electrically coupled to selected terminals of first and second polarity types on the top surface of a capacitor.

For the above reasons, claim 16 should be found to be allowable over Wallace, and Applicants respectfully request that the rejection of claim 16 under 35 U.S.C. §102(b) as anticipated by Wallace be withdrawn.

Claims 17-19, 22-24, 26, and 30, which depend from claim 16 and incorporate all of the limitations therein, are also asserted to be allowable for the reasons presented above.

Rejection of Claims 16-19, 22-24, 26-28, and 30**Under 35 U.S.C. §102(e)****as Anticipated by Tao**

Claims 16-19, 22-24, 26-28, and 30 were rejected under 35 U.S.C. §102(e) as being anticipated by Tao (U.S. 6,316,828). Applicants do not admit that Tao is prior art and reserve the right to swear behind Tao as provided for under 37 C.F.R. §1.131.

Tao discloses placing a capacitor 311 (FIG. 6) on a substrate close to, but not underneath, a chip area 310 (see col. 3, lines 53-55). It will be noted that in Tao the capacitor is not within the IC mounting region, and that a chip is not electrically coupled to terminals on the top surface of capacitor 311.

Thus, Tao fails to disclose all of the structural elements recited in claim 16, as amended, because Tao fails to disclose an IC having terminals electrically coupled to selected terminals of

first and second polarity types on the top surface of a capacitor located within the IC mounting area.

For the above reasons, claim 16 should be found to be allowable over Tao, and Applicants respectfully request that the rejection of claim 16 under 35 U.S.C. §102(e) as anticipated by Tao be withdrawn.

Claims 17-19, 22-24, 26-28, and 30, which depend from claim 16 and incorporate all of the limitations therein, are also asserted to be allowable for the reasons presented above.

Rejection of Claims 16-21, 24, 26, 28, 29,
65-73, 75-78, 81, 82, 84, and 85
Under 35 U.S.C. §102(e)
as Anticipated by Salem

Claims 16-21, 24, 26, 28, 29, 65-73, 75-78, 81, 82, 84, and 85 were rejected under 35 U.S.C. §102(e) as being anticipated by Salem (U.S. 6,300,677). Applicants do not admit that Salem is prior art and reserve the right to swear behind Salem as provided for under 37 C.F.R. §1.131.

Salem discloses an IC 82 (FIG. 4A) mounted over a plurality of capacitor assemblies 86. Each capacitor assembly 86 has positive and negative terminals on its top and bottom surfaces (see FIG. 2 and col. 3, lines 8-15). The capacitor assemblies are each located in a connection well 88 (col. 4, line 24). It will be noted that in Salem the first and second conductors are not located on a substantially planar upper surface of the substrate, but instead they are located in connection well 88.

Regarding independent claim 16, as amended, Salem fails to disclose all of the structural elements recited, in that Salem fails to disclose an IC package with a substrate having a substantially planar upper surface, because Salem's package substrate 84 contains a connection well 88 in the upper surface. Further, Salem fails to disclose first and second conductors on a substantially planar upper surface to which selected terminals of the capacitor are electrically coupled.

For the above reasons, claim 16 should be found to be allowable over Salem, and Applicants respectfully request that the rejection of claim 16 under 35 U.S.C. §102(e) as anticipated by Salem be withdrawn.

Claims 17-21, 24, 26, and 28-29, which depend from claim 16 and incorporate all of the limitations therein, are also asserted to be allowable for the reasons presented above.

Regarding independent claims 65, 70, 75, and 81, Salem fails to disclose a plurality of conductors within an IC mounting area, wherein the conductors include at least a first conductive bar having a height and a width, the height exceeding the width.

For the above reasons, independent claims 65, 70, 75, and 81 should be found to be allowable over Salem, and Applicants respectfully request that the rejection of independent claims 65, 70, 75, and 81 under 35 U.S.C. §102(e) as anticipated by Salem be withdrawn.

Claims 66-69, 73, 76-78, 82, 84, and 85, which depend from independent claims 65, 70, 75, and 81 and incorporate all of the limitations therein, are also asserted to be allowable for the reasons presented above.

Rejection of Claims 65, 67, and 68
Under 35 U.S.C. §102(b)
as Anticipated by Baudouin

Claims 65, 67, and 68 were rejected under 35 U.S.C. §102(b) as being anticipated by Baudouin (U.S. 6,040,983).

Baudouin discloses the placement of a single component 20 (FIG. 3), such as a capacitor, between a memory chip lead 18a (FIG. 4) and a land 16b of a PWB 16.

Regarding independent claim 65, Baudouin fails to disclose a capacitor within an IC mounting region. Nor does Baudouin disclose a plurality of conductors within an IC mounting region, wherein the conductors include at least a first conductive bar having a height and a width, the height exceeding the width. Nor does Baudouin disclose a capacitor being electrically coupled to and mounted atop such a first conductive bar.

For the above reasons, independent claim 65 should be found to be allowable over Baudouin, and Applicants respectfully request that the rejection of independent claim 65 under 35 U.S.C. §102(b) as anticipated by Baudouin be withdrawn.

Claims 67 and 68, which depend from independent claim 65 and incorporate all of the limitations therein, are also asserted to be allowable for the reasons presented above.

**Rejection of Claim 30 under 35 U.S.C. §103(a)
as Unpatentable over Salem**

Claim 30 was rejected under 35 U.S.C. §103(a) as being unpatentable over Salem (U.S. 6,300,677).

Salem was discussed earlier.

Claim 30 is dependent upon claim 16, which is asserted to be patentable over Salem for the reasons presented earlier.

If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. MPEP §2143.03.

Thus, claim 30 should be allowable.

**Rejection of Claim 74 under 35 U.S.C. §103(a) as Unpatentable
over Salem in view of Galvagni**

Claim 74 was rejected under 35 U.S.C. §103(a) as being unpatentable over Salem in view of Galvagni (U.S. 6,459,561).

Galvagni discloses an interdigitated capacitor.

Claim 74 is dependent upon claim 70, which was asserted to be patentable over Salem for the reasons presented above.

If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. MPEP §2143.03.

Thus, claim 74 should be allowable.

Additional Elements and Limitations

Applicants consider additional elements and limitations of claims 16-21, 26-30, 65-85, and 87-107 to further distinguish over the cited references, and Applicants reserve the right to present arguments to this effect at a later date.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 10/006,292

Filing Date: December 3, 2001

Title: INTEGRATED CIRCUIT PACKAGE WITH SANDWICHED CAPACITORS

Assignee: Intel Corporation

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Dkt: 884.534US1 (INTEL)

Conclusion

Applicants respectfully submit that claims 16-21, 26-30, 65-85, and 87-107 are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicants' attorney, Walter W. Nielsen (located in Phoenix, Arizona) at (602) 298-8920, or the below-signed attorney (located in Minneapolis, Minnesota) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

P.R. PATEL ET AL.

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Date June 1, 2004

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 1st day of June 2004.

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